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National Oceanic and
Atmospheric Administration
U.S. Dept. of Commerce

PART B.⁽¹⁾

SNOWFALL.

Cold-weather period, January and February.

I.—PERSIA.

Meshed.—Snow fell on seven days in January and on five days in February. The amount of precipitation was 23.4" and 2.2", respectively. The snowfall was more than usual.

II.—AFGHANISTAN.

Kabul.—Definite information is not available. But it appears that the snowfall was abundant and definitely more than usual, as far as could be ascertained.

III.—BALUCHISTAN.

Quetta.—On ten days in January and on four days in February snow or rain fell. The amounts measured were 2.59" and 0.82" for January and February respectively. It was reported that the snowfall was more than usual.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara.*—The following table will give an idea of the character of snowfall during the two months. The snowfall was normal.

Locality.	No. of days of snowfall.	Amount.	Accumulation at the end of the month.
JANUARY.			
Inner Hills—			
Narang	13	Ft. In. 13 2	Ft. In. 11 5
Paludran	13	11 2	9 5
Kagan	13	8 7	6 7
Jared	5	1 10	0 6
Malkandi	4	1 10	0 2
Sundigali	7	4 9	4 0
Jacha	10	7 1	7 1
Outer Hills—			
Thandiani	7	2 0	5 6
Dungagali	5	1 1	3 10
Birangali	8	3 10	1 6

Locality.	No. of days of snowfall.	Amount.	Accumulation at the end of the month.
FEBRUARY.			
Inner Hills—			
Narang	11	Ft. In. 7 11	Ft. In. 7 11
Paludran	11	6 9	6 9
Kagan	11	5 3	5 3
Jared	1	0 3	..
Malkandi . . . . .	..	..	..
Sundigali . . . . .	..	..	2 0
Jacha . . . . .	..	..	2 0
Outer Hills—			
Thandiani	2	1 0	2 6
Dungagali	1	0 4	1 0
Birangali	2	0 8	..

(b) *Dir, Swat and Chitral.*—It was reported from Chitral that it had twelve days of snowfall during the period and that the total amount was nearly two feet, which was more than usual.

(c) *Khyber Agency.*—The amount of snow that lay on the surrounding hill-tops of Sufed-Koh range was normal this season.

(d) *Kohat.*—Fort Lockhart had 1½ feet and ¾ foot of snowfall during January and February respectively.

(e) *North Waziristan.*—From the graduated snow-box it was found that fifteen inches and one and three-quarter inches of snow fell in January and February respectively.

V.—KASHMIR.

(a) *Skardu.*—On seventeen days of January snowfall was recorded, the accumulated amount being 2.95". During February actual snowfall was noticed on five days but it was too small to be measured.

(b) *Dras.*—Heavy snowfalls were observed frequently during the months, and snow-storm was seen on the last two days of February. The amount was more than normal.

⁽¹⁾ This part is based on the reports received mainly from the local Government Officers, who, in their turn, collect the required information from the local residents.

⁽²⁾ When amounts are given purely in inches it is to be understood that the snow has been melted and measured as water, and when mentioned in feet it means the depth of snow lying on the ground.

National Oceanic and Atmospheric Administration

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GOVERNMENT OF INDIA
METEOROLOGICAL DEPARTMENT

INDIA WEATHER REVIEW

ANNUAL SUMMARY FOR 1930

PART B
SNOWFALL

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Director General of Observatories

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(c) *Srinagar*.—During the month of January heavy snow fell, the fall on the 31st being the heaviest. It caused damage to property and crops. The total precipitation for the month was 10·61", nearly thrice the usual amount. Frequent snowfalls were observed on the surrounding hills and snow fell seven times in the main valley during February. The amount of precipitation for the month was 2·38" which is slightly below normal.

(d) *Kargil*.—Snow fell on thirteen days during January and on seven days in February, and the amounts noted were 3·16" and 5·01" respectively. Snow lay on the higher passes at the end of the months January and February to depths of four feet and a half, and six feet respectively.

VI.—PUNJAB.

(a) *Rawalpindi*.—Snow fell five times during the period in question as detailed below.

Date of Snowfall.	Depth.	Peak on which it fell.
14th January 1930	6·5"	Murree.
16th January 1930	4·5"	Patriata.
29th January 1930	6·0"	Lower Topa.
1st February 1930	3·0"	Upper Topa.
10th February 1930	3·0"	Kuldana.

The snowfall was normal.

(b) *Kulu (Kangra District)*.—More than the usual amount of snow fell during the season. Snow to a depth of ten feet in January and to a depth of three feet in February lay over the tops of the Dhauri Dhar range.

(c) *Simla*.—On eight days in January and on ten days in February snow fell; and at end of the months the amount accumulated were a foot and three quarters and two feet and a half respectively. The snowfalls accompanied by strong winds caused great damage to the roads and trees. The amount of snowfall was above average. The depths of

snow at the various hill-tops were as follows:—

Place.	At the end of January.	At the end of February.
	Ft.	Ft.
Kailash Peak	25	28
Rupan Pass	18	20
Shatul Pass	15	18
Brus Pass	15	18

VII.—UNITED PROVINCES.

(a) *Almora*.—In this district Malla Darma had fourteen feet and eleven feet of snow during January and February, while Biyans had during the same periods eleven feet and seven feet of snow. Malla Darma had less snow than normal in February while during January both the places had more than the usual amount.

At the close of the months January and February the amounts of snow that lay at Nuwe were 30 ft. and 24 ft., at Lipulekh 37 ft. and 24 ft., and at Lampia Pass 46 ft. and 33 ft. respectively.

(b) *Garhwal*.—During six days in January and one day in February snow fell and nearly four feet of snow lay on the ground during the period.

VIII.—ASSAM.

(a) *Kamrup*.—During the month of January heavy falls of snow occurred which blocked some of the higher passes like Kepegauai. The passes remained blocked for a fortnight. The month of February did not contribute much to the snowfall and so the total fall for the season was normal.

(b) *Sadiya Frontier Tract*.—Snowfall which was heavy at the close of the previous year weakened at the beginning of January and the passes cleared. The previous accumulation of snow on the ground had been so large that even during the season under consideration more than the usual amount lay on the ground.

(c) *Balipara Frontier Tract*.—Due to heavy snowfalls accompanied with storms snow was observed at the height of 6,000 ft. above sea level on the outer ranges on the 24th and the 25th of January. Further snowstorms occurred during the beginning and the close of February. It is believed that the snowfall was more than usual.

The Hot Weather Period, March to May.

I.—PERSIA.

Meshed.—Information for the period is not available.

II.—AFGHANISTAN.

Kabul.—Definite information is lacking. The hill tops round the Kabul plain were reported to have been covered with snow even in May.

III.—BALUCHISTAN.

Quetta.—No snow fell during the period.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara*.—Snow fell six times in March on the inner hills of Narang, Paludran and Kagan and snow lay on the ground to depths of 2½ ft., 2 ft., 1½ ft. at the respective stations. The amount was below normal.

By the end of May snow lay on the ground in the neighbourhood of Abbottabad at altitudes of 10,000 ft. to 17,500 ft. to depths of 1·75 ft. to 7·5 ft. The amount was normal.

(b) *Dir, Swat and Chitral*.—On the 8th of April at a height of 7,000 ft. ½ foot of snow fell. No fresh falls occurred.

ed later. Yet more snow lay on the hill tops and the passes than usual. Lowarai Pass which was clear for mule traffic on 12th May in the previous year remained blocked even on the last day of May this year. The amount of snow that lay on the hill tops and passes surrounding Drosh was normal.

(c) *Khybar Agency*.—No snowfall was reported.

(d) *Kurram*.—Parachinar had no snowfalls. On the Sufed Koh range snow fell thrice during the month and more snow lay on the ground than usual.

(e) *Kohat*.—No snow fell.

(f) *North Waziristan*.—No snow fell in the plains. The snow on the hill tops was normal.

(g) *South Waziristan*.—No snowfall occurred but the hill tops were covered with snow till the end of May.

(h) *Dera Ismail Khan*.—Unusual snowstorms occurred on 8th and 9th of April. Snow lay on Takht-i-Suleiman till the middle of April and by the middle of May all the hill tops were cleared.

V.—KASHMIR.

(a) *Skardu*.—Snow fell on the surrounding hills seven days in March, six days in April and three days in May. The amount of precipitation for the months as observed were 2.65", 1.77", and 0.12" respectively.

(b) *Dras*.—Several heavy falls of snow occurred during the months of March and April. In May all the well known and higher passes were covered with deep snow. The snowfall for the season was above normal.

(c) *Srinagar*.—Some light falls of snow occurred on the surrounding hills.

(d) *Gulmarg*.—At the close of May some light to moderate snowfalls fell on the Affarwat Range.

(e) *Kargil*.—Snow fell on five days in March and on three days in April. Snow lay on the well known hill tops to a depth of three feet in May. The snowfall was above normal.

(f) *Leh*.—Several light falls of snow occurred in May.

VI.—PUNJAB.

(a) *Rawalpindi*.—No snow fell during the period.

(b) *Chamba*.—During May fresh falls of snow were seen on the hill tops and passes on those days when it rained below. At the passes the amounts were normal.

(c) *Kulu (Kangra District)*.—Snow fell only on the high peaks. The amounts that lay at the close of May are given below.

AMOUNT THAT LAY ON THE GROUND.

Name of Pass or Peak.	This year.		Last year.	
	Ft.		Ft.	
Rohtang Pass	8		3	
Hamta	10		5	
Pujadhar	5		2	
Chandarkhani	3		2	
Sirikhand	5		6	
Tirath	7		1	

The amount that lay on the ground was above normal.

(d) *Kilba (Simla District)*.—Snow fell on ten days in March, nine days in April and twelve days in May; the amounts on the ground were 1 ft. 6.5"; 9 inches, and 6.75" respectively. The snowfall was above normal. The amounts that lay on well known peaks and passes are as follows :—

Place.	ACCUMULATIONS AT THE END OF		
	March.	April.	May.
	Ft.	Ft.	Ft.
Kailash Peak	25	20	16
Rupan Pass	17	12	10
Brua Pass	15	10	8
Shathul Pass	15	10	8

The amounts above were more than normal.

VII.—UNITED PROVINCES.

(a) *Almora*.—The following table gives an idea of the snow that lay on the ground at the close of the respective months :—

Place.	March.	April.	May.
	Ft.	Ft.	Ft.
Biyans	10	..	13.25
Malla Darna	8	..	7.5
Malla Johar . . . . .	..	..	2.5
Malla Danpur . . . . .	..	..	2.0

Information for the month of April is not available but at the end of March snow lay at Nuwe, Lampia and Lipu to depths of 15, 21 and 15 feet respectively. The figures for the month of May are 7.5, 18.66 and 13 feet respectively.

VIII.—ASSAM.

(a) *Sadiya Frontier Tract*.—Information not available.

(b) *Balipara Frontier Tract*.—The snow that lay on the ground this year was reported to be more than usual.

South-West Monsoon Period, June to September.

JUNE AND JULY.

I.—PERSIA.

No reports were received.

II.—AFGHANISTAN.

Kabul.—Only a slight fall of snow was observed on the hills. There was an abundant amount of snow seen on the Sufed Koh range, but only patches lay on the Hindu-Kush range.

III.—BALUCHISTAN.

No reports were received.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Dir, Swat and Chitral*.—At the commencement of the month of June there were slight falls of snow on the high ranges of Swat and more snow lay on the ground than usual. Elsewhere there was no snowfall and the usual amount of snow lay on the tops of the hills.

(b) *Khybar Agency*.—No snow fell during the period and the usual amount of snow lay on the hill tops of Tirah.

(c) *Kurram*.—At the close of the month of June heavy snowfalls occurred on the Sikaran Peak. More than the usual amount of snow covered the peak.

(d) *South Waziristan*.—No snow fell during the period in these tracts.

V.—KASHMIR.

(a) *Skardu*.—On two days in June snow was observed to fall on surrounding hills.

(b) *Dras*.—No snow fell during the period, but the high peaks that were visible were enveloped by snow.

(c) *Srinagar*.—On the 30th July snow was observed to fall on the surrounding hills.

(d) *Gulmarg*.—Several light to moderate falls of snow occurred on the Affarwat range during the month of June. In the month of July light snow fell on four days on the South-Western mountain range.

(e) *Kargil*.—No snow fell during the period, but the depth of snow on the higher peaks and passes was about two feet and one foot during the months of June and July respectively.

(f) *Leh*.—At the close of the month of June some falls occurred. However rapid thawing set in soon after.

VI.—PUNJAB.

(a) *Chamba*.—In the Ravi Valley snow fell above 11,000 ft. while sleet occurred between 8,000 and 11,000 ft. during the month of June. During the first week of June snow fell in the Chenab Valley and covered heights above 10,000 ft. A fall of temperature during the second week of June lowered the snowline to 8,500 ft. During the month of July sleet fell at heights of 11,000 ft. More snow lay on the ground than usual and at an elevation of 14,000 ft. the depth was not less than 7 feet.

(b) *Kulu (Kangra District)*.—Snowfalls occurred on eight days in June and twice in the month of July. The amount was 10". At an altitude of 15,000 ft. snow lay to a depth of 3 feet. Thawing was in rapid progress.

(c) *Kilba (Simla District)*.—On six days in June and four times in July snow fell, the total amounts being 2.25" in both the months. The depths of snow that lay on well known peaks and passes are given in the following table:—

Pass or Peak.	ACCUMULATIONS AT THE END OF	
	June.	July.
	Ft.	Ft.
Rupan	7.0	3.0
Brua	5.0	1.5
Shatul	5.0	1.5
Kailash	13.0	7.0

The amounts were above normal.

VII.—UNITED PROVINCES.

(a) *Almora*.—At the close of the month of June Malla Darma reported four feet and a half depth of snow which was less than usual, and Biyans reported twenty feet and four inches which was above normal. At the end of July the depths of snow at the stations are given as:—

	Ft.	In.
Malla Darma	3	2
Malla Danpur	1	0
Biyans	8	3
Chaudans and Talla Darma	3	5

The snowfall was less than usual at all stations except Malla Darma.

The amount of snow that lay on well known peaks and passes are tabulated below:—

Pass or Peak.	ACCUMULATIONS AT THE END OF	
	June.	July.
	Ft.	Ft.
Nuwe.	4.5	3.5
Lipulekh	16.5	3.0
Lampia	24.0	5.0
Panchachuli . . . . .	..	15.0
Pindari . . . . .	..	1.0
Kafiri . . . . .	..	1.0
Puwalidwar . . . . .	..	1.0
Nandakote . . . . .	..	1.0
Binkaru . . . . .	..	3.0

(b) *Garkwal*.—The amounts of snow that lay on the mountain ranges and hills are reported to have been three to eight inches during the season.

VIII.—ASSAM.

No snowfall was reported.

AUGUST AND SEPTEMBER.

I.—PERSIA.

No falls were reported.

II.—AFGHANISTAN.

No falls were reported.

III.—BALUCHISTAN.

No falls were reported.

IV.—NORTH-WEST FRONTIER PROVINCE.

No falls were reported.

V.—KASHMIR.

(a) *Skardu*.—On two days in August and five days in September snow fell on the neighbouring peaks.

(b) *Dras*.—During September one or two slight falls were observed on the hills.

(c) *Srinagar*.—On the 12th and 13th of September light falls were observed on the neighbouring hills.

(d) *Gulmarg*.—During the month of September moderate to heavy snowfalls were observed on the Affarwat range.

(e) *Kargil*.—Snow lay to a depth of $\frac{3}{4}$ foot and $\frac{1}{2}$ foot respectively during August and September.

VI.—PUNJAB.

(a) *Kilba*.—Snow fell on four days in the month of August and on three days in September. The amounts for the

respective months were 1.75" and 6.75". The amounts of snow on the peaks were:—

Pass or Peak.	ACCUMULATIONS AT THE END OF	
	August.	September.
	Ft.	Ft.
Kailash	6	6
Rupan	2	2
Brus	1	2
Shatul	1	1

The amounts above are more than normal.

VII.—UNITED PROVINCES.

(a) *Almora*.—The amounts of snow at the close of the months August and September, are:—

Place.	August.		September.	
	Ft.	In.	Ft.	In.
Malla Darma	3	10	4	9
Biyans	10	0	2	6
Malla Johar	4	3	..	..

The amounts were less than usual.

The peaks were covered by snow to the depths given by the table below:—

Pass or Peak.	ACCUMULATIONS AT THE END OF			
	August.		September.	
	Ft.	In.	Ft.	In.
Nuwe	2	0	4	0
Lipulekh	6	0	5	0
Milain	1	3	..	..
Baydwar	0	3	..	..

VIII.—ASSAM.

No falls were reported.

The retreating monsoon period, October to December.

I.—PERSIA.

Information is not available.

II.—AFGHANISTAN.

Kabul.—There was snowfall on 17th of October at the Paghman Hills. Some slight falls were again observed on 28th of October and 23rd of November. At Kabul slight snow fell on December 13th. No information is available as regards the snowfall in the Hindu-Kush range and northern parts of Afghanistan.

III.—BALUCHISTAN.

No snow fell at Quetta and no snow capped the surrounding hills.

IV.—NORTH-WEST FRONTIER PROVINCE.

(a) *Hazara.*—Snow fell during the month of December and the details are given below:—

Place.	Number of days of snowfall.	Amount.	Accumulation at the end of December.
		In.	In.
Inner Hills—			
Narang	4	10	4
Pajudran	4	7	2
Kagan	4	3.5	1
Jared . . . . .	..	..	..
Malkandi . . . . .	..	..	..
Sundigali	2	2	2
Jacha	2	2	1.5
Outer Hills—			
Thandiani	2	2	1
Dungagali	2	4	3
Birangali	1	6	3

The snowfall was less than usual and the ground-depth of snow was below normal.

(b) *Dir, Swat and Chitral.*—On two days in December snow fell in Drosh and its amount was 2.5". Nearly one foot snow lay in the Lowari Pass at the end of November. At Chitral snow fell on four days in October and two days in November and the amounts were respectively 14.5" and 6.0".

(c) *Kurram.*—The snow that fell on 14th of October for the first time during the season over the Sufed Koh range melted in a week's time. Heavy falls however occurred on 24th of November and on 3rd and 12th of December and

the range remained completely capped by snow during December. The snowfall was reported to be less than usual. Parachinar had no snow.

(d) *Kohat.*—In November there was no snowfall at Fort Lockhart while in December 5" of snow fell.

(e) *South Waziristan.*—No fall occurred.

V.—KASHMIR.

(a) *Skardu.*—During the month of October on fourteen days snow was observed to fall on the surrounding hills and to lie to a depth of about three feet at tops. During November only on two dates, the 17th and 24th, snowfall was seen on the hills. During December snow fell at Skardu on 13th and 14th and over the surrounding hills for five days. The total fall for the month was 9.25".

(b) *Dras.*—Several snowfalls on ground and on the neighbouring hills were reported during October. The amounts were normal. During the month of November only a slight fall occurred on the 1st of the month, the amount being less than normal. A few falls occurred during December but the amount did not come up to normal. All the surrounding peaks were covered with snow during the season.

(c) *Srinagar.*—Several moderate to heavy falls of snow on the surrounding hills were observed during the season. The total for the period was less than normal.

(d) *Kargil.*—On 20th and 22nd in October, on 2nd in November and 14th and 29th in December snow fell and the amounts were 0.05", 0.02" and 0.15" respectively. The amount was above normal for October and less than normal for the other two months. Snow to depths of ten inches, one foot and one foot and a half lay on well known surrounding peaks during the three respective months.

VI.—PUNJAB.

(a) *Kulu (Kangra District).*—During the months of November and December snowfall was confined to heights greater than 12,000 ft. The amounts on well known peaks were as follows:—

Place.	Accumulation.
	Ft.
Kulu Tahsil—	
Rohtang	0.5
Hampta	1.0
Barsai	0.5
Pajedhar	0.5
Lohari Achhri	0.5
Saraj Tahsil—	
Siri Khand	3.0
Gargarasan	1.0
Shupakun	0.5
Tirath	2.0

The snowfall was below normal.

(b) *Kilba (Simla District).*—On nine days in October and two days in November snow fell, the amounts being 6.25 and 2.5 inches respectively. Only once, on the 28th, snow fell during December. The amounts of snow that lay on some peaks and passes are given below :—

Pass or Peak.	DEPTH OF SNOW AT THE END OF		
	October.	November.	December.
	Ft.	Ft.	Ft.
Kailash	8	8.5	12
Rupan	4	4.5	8
Brua	4	4.5	8
Shatul	3	3.5	7

VII.—UNITED PROVINCES.

(a) *Almora.*—The following table gives the depth of snow at the close of the respective months at various places.

Place.	October.	November.	December.
	Ft.	Ft.	Ft.
Biyans.	18.5	8	3.5
Malla Darma	7.5	10	nil
Malla Danpur . . . .	..	..	1.5
Malla Johar . . . . .	..	..	0.75

The snowfall was below normal in October and December but slightly in excess in November. The depths of snow on peaks are given below :—

Pass or Peak.	DEPTH AT THE END OF		
	October.	November.	December.
	Ft.	Ft.	Ft.
Lampia	12.5	15	18
Lipulekh	9.0	10.0	12.0
Nuwe	10.0	15.0	15.0
Untadhura . . . . .	..	..	4.75
Ralamdhara . . . . .	..	..	4.75
Milain . . . . .	..	..	0.75
Bagdwar . . . . .	..	..	0.25
Pindari . . . . .	..	..	1.5
Kafni . . . . .	..	..	1.5
Nandakote . . . . .	..	..	1.5
Puwalidwar . . . . .	..	..	1.5
Kantila . . . . .	..	..	1.5
Kunga Bingri . . . . .	..	..	6.0

VIII.—ASSAM.

It is reported that about the middle of November heavy snowfall occurred. The snowfalls in the remaining portion of the season were less than usual.

(a) *Sadiya Frontier Tract.*—The snowfall during November was less than usual but normal during December. It is reported that crossing the passes was not difficult.

(b) *Balipara Frontier Tract.*—Severe conditions of weather were reported from this Tract throughout the last two months of the year. The snowfall was greater than usual and the Se-ha pass was closed.

Summary.

Cold weather period, January and February.—The snowfall was more than usual at Meshed (Persia), Afghanistan and Baluchistan. It was normal in the North-West Frontier Province. At Srinagar the snowfall was in excess in January but in defect in February. At other places in Kashmir the amounts were in excess. In the northwest Punjab the snowfall was normal, but in the Kangra and Simla divisions it was in excess. Except for a slight defect of snow on Malla Darma in February the precipitation was in excess in the United Provinces during the period. Kamarup had normal precipitation and the amount on the Sadiya and Balipara Frontier Tracts were more than usual.

Hot weather period, March to May.—The hill tops of Afghanistan were covered with snow even in May. No

snow fell in Baluchistan. In the Hazara division of North-West Frontier Province less than the usual amount lay on the ground but at heights of 10,000 ft. and more there was normal amount of snow. In Kurram and Dir, Swat and Chitral divisions more than usual amount lay on the ground. No snow fell in the Khyber Agency, (Kohat), north and south Waziristan. Dera Ismail Khan had an unusual fall in April. In Kashmir the snowfall was almost normal except in Dras and Kargil where it was in defect. In the Kangra and Simla divisions of the Punjab usual amounts lay on the hill tops, and elsewhere in the Province normal. In the United Provinces the amounts that lay on the ground were normal. In Assam the Balipara Frontier Tract had more snow than usual on the ground.

Southwest Monsoon period, June and July.—Slight falls of snow were observed on the hills of Afghanistan. In Persia and Baluchistan no snow fell. In Kurram, Dir, Swat and Chitral divisions of North-West Frontier Province more than the usual amount lay on the hill tops and in the Khyber Agency the normal amount was observed. Kashmir had normal snow. In the Chamba division of the Punjab at heights of 11,000 ft. there was more than usual amount of snow. In the Simla division it was in excess. In the United Provinces the amounts were almost normal. No snow fell in Assam.

The Southwest monsoon period, August and September.—No falls occurred in Persia, Afghanistan, Baluchistan and North-West Frontier Province. On the hills of Kashmir snowfalls were observed. In the Simla division of the Punjab the accumulations on the hill tops were more than normal. In the United Provinces the amounts were in defect. No snow fell in Assam.

The retreating monsoon period, October to December.—In Afghanistan light falls occurred during the period. In the North-West Frontier Province the snow was in defect. In Kashmir the snowfall began in November but the amount was less than usual. Kangra division in the Punjab had less than the usual amount and Simla division the normal amount of snow. In the United Provinces the amount of snowfall was in excess in November and in defect in December. Snow fell during the middle of November in Assam but the total amount for the period was in defect in the Sadiya Frontier Tract and in excess in the Balipara Frontier Tract.

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